

CLAIMS

1. A rotating electric machine with a built-in control device comprising:

5 a main body of the rotating electric machine including:

a stator;

a rotor having a rotary shaft;

10 brackets provided on both sides of said stator, one on a load side and the other on a side opposite the load side, for rotatably supporting said rotor via said rotary shaft; and

15 a fan which is provided on said rotor and rotates together with said rotor to induce a flow of cooling air for cooling at least one of said stator and said rotor; and

the control device including control components for controlling said main body of the rotating electric machine, said control device being fixed to the outside of the bracket on said side opposite the load side in an axial direction of said rotary shaft in such a manner that a particular spacing is formed between said control device and the bracket on said side opposite the load side and said flow of cooling air passes through this spacing.

2. The rotating electric machine with the built-in control device as recited in claim 1, said rotating electric machine with the built-in control device being characterized in that said control device includes a heat sink for dissipating heat of said control components, wherein said heat sink is fixed with said particular spacing provided between said heat sink and the bracket on said side opposite the load side and is cooled by said flow of cooling air.

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3. The rotating electric machine with the built-in control device as recited in claim 2, said rotating electric machine with the built-in control device being characterized in that said stator includes polyphase AC windings, and said control device includes as said control components:

a switching device for converting a DC input into an AC output and supplying said AC output to said polyphase AC windings;

20 said heat sink for cooling this switching device;

a capacitor connected to said DC input side of said switching device; and

a control circuit board having a control circuit for controlling said switching device;

25 wherein said control circuit board and said heat sink

are so disposed as to overlap each other in the axial direction of said rotary shaft, and said heat sink is fixed to the bracket on said side opposite the load side in such a manner that said heat sink is cooled by said flow of 5 cooling air.

4. The rotating electric machine with the built-in control device as recited in claim 3, said rotating electric machine with the built-in control device being 10 characterized in that said control circuit board is fixed to the bracket on said side opposite the load side with spacers placed between said heat sink and the bracket on said side opposite the load side to maintain said particular spacing.

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5. The rotating electric machine with the built-in control device as recited in claim 4, said rotating electric machine with the built-in control device being characterized in that said control device supplies said AC 20 output to said polyphase AC windings via a plurality of conductors, said control device is provided with composite conductors each of which is made by combining one of said spacers and one of said conductors into a single structure, said conductors are passed through said heat sink and the 25 bracket on said side opposite the load side, and said heat

sink is fixed to the bracket on said side opposite the load side by said composite conductors in such a manner that said spacers maintains said particular spacing.

5        6. The rotating electric machine with the built-in control device as recited in claim 5, said rotating electric machine with the built-in control device being characterized in that said conductors are rodlike conductors, and each of said composite conductors includes 10 an insulating shield member covering an outer periphery of said conductor, a cylindrical thread member mounted on an outer peripheral side of said insulating shield member, said thread member having an externally threaded part, and a ring-shaped annular member having a specific length along 15 an axial direction of said conductor, said annular member being disposed in such a manner that said externally threaded part on an outer periphery of said thread member remains disposed on both sides along the axial direction of said conductor, wherein one end portion of said externally 20 threaded part left disposed is passed through said heat sink and a nut is screwed onto said one end portion of said externally threaded part to fasten said heat sink between said nut and said annular member while the other end portion of said externally threaded part left disposed is 25 passed through the bracket on said side opposite the load

side and another nut is screwed onto said other end portion of said externally threaded part to fasten the bracket on said side opposite the load side, whereby said heat sink is fixed to the bracket on said side opposite the load side in 5 such a manner that said annular member is positioned as said spacer between said heat sink and the bracket on said side opposite the load side.

7. The rotating electric machine with the built-in 10 control device as recited in claim 3, said rotating electric machine with the built-in control device being characterized in that said control device is such that said switching device is arranged to be positioned approximately on the circumference of a circle having a specific diameter 15 centered around the axis of said rotary shaft and said capacitor is arranged at a central part of said circle.

8. The rotating electric machine with the built-in 20 control device as recited in claim 3, said rotating electric machine with the built-in control device being characterized in that said control device includes a cover covering said control circuit board from the axial direction of said rotary shaft and a heat-conducting member disposed between said control circuit board and said cover 25 for conducting heat therebetween.